

A REDESCRIPTION OF *TUBIFICOIDES*
HETEROCHAETUS (MICHAELSEN)
(OLIGOCHAETA: TUBIFICIDAE)

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Abstract.—*Tubificoides heterochaetus* (Michaelsen, 1926) (Oligochaeta: Tubificidae) is redescribed from type-material and is compared to new material of this species from North Carolina. Oversights in the original description and recent literature are corrected.

Access to one of the syntypes of *Tubificoides heterochaetus* (originally described as *Limnodrilus heterochaetus* Michaelsen, 1926), and to mature material of this species from North Carolina has necessitated a redescription as the original description and recent literature have been found to be lacking in some respects.

This species is now seen to possess a thin but distinct penis sheath and both bifid and simple-pointed setae posteriorly.

The syntype described here is accorded lectotype status.

Methods and Materials

One of the syntypes of *Limnodrilus heterochaetus* Michaelsen, 1926 was loaned to Dr. R. O. Brinkhurst, courtesy of Dr. M. Dzwillo, Zoologisches Institut and Zoologisches Museum (ZIZM), Universität Hamburg, W. Germany. Mr. Brian Woodard sent several specimens of *T. heterochaetus* from North Carolina for identification. All material was stained in paracarmine and mounted whole in Canada Balsam. Some of the North Carolina material has been deposited in the Smithsonian Institution, United States National Museum of Natural History (USNM), Washington, D.C.

Systematic Description

Tubificoides heterochaetus (Michaelsen, 1926)

Figs. 1, 2

Limnodrilus heterochaetus Michaelsen, 1926:22, fig. A (a-d); 1927:17, fig. 19.

Limnodrilus heterochaetus Michaelsen.—Bülow, 1957:99.—Popescu-Marinescu et al., 1966:1963.

Pelosclex heterochaetus (Michaelsen).—Marcus, 1942:156.—Marcus, 1950:4.—Cekanovskaya, 1962:279, figs. 176, 177.—Brinkhurst, 1963a:44,

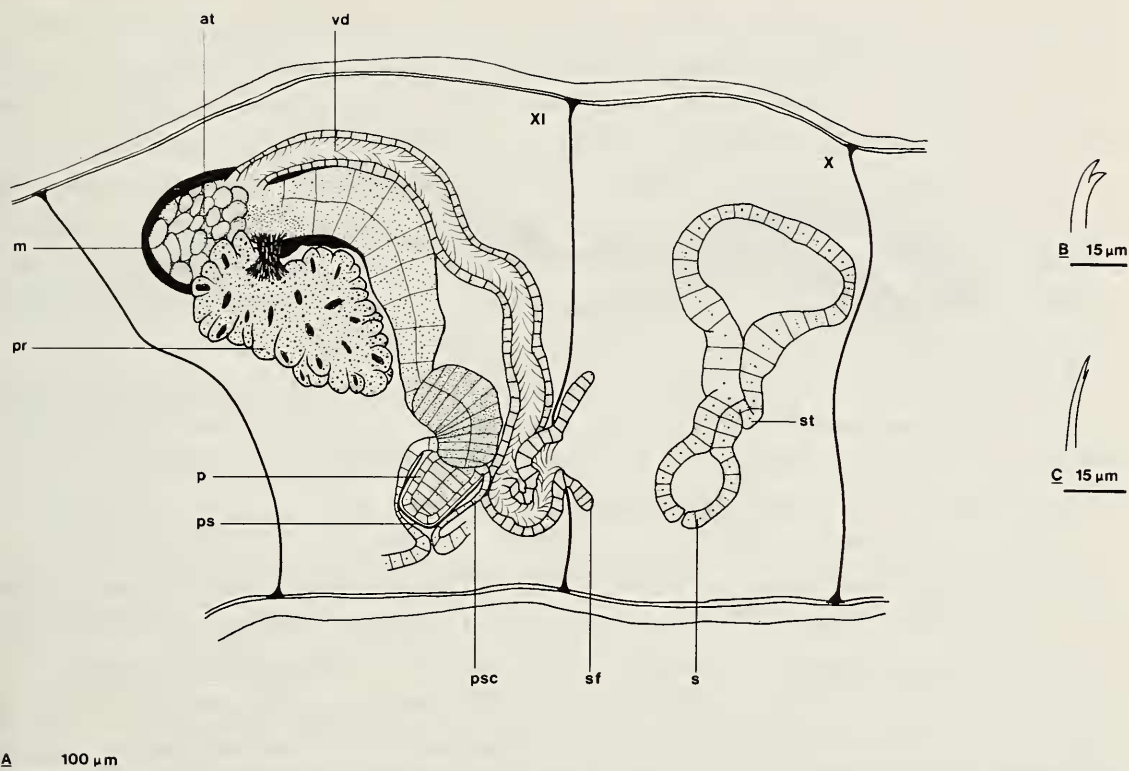


Fig. 1. *Tubificoides heterochaetus*: A, Male duct and spermatheca of lectotype, notation as in description, penis sheath thickened slightly to show form; B, Dorsal anterior bifid seta; C, Dorsal posterior bifid seta.

fig. 31; 1963b:713.—Hrabé, 1964:109.—Brinkhurst and Jamieson, 1971:521, figs. 8, 14 (G–I).

Tubificoides heterochaetus (Michaelsen).—Brinkhurst and Baker, 1979:1556.

Description (lectotype).—Length 5.1 mm, width at X $380\ \mu\text{m}$ (in fixed, slightly compressed specimen), 29 segments (incomplete). Prostomium shorter than broad at peristomium, conical. Clitellum weak over $\frac{1}{2}\text{X}$ – $\frac{1}{2}\text{XII}$. Body wall slightly papillate posteriorly with foreign material adhering. Segments II–VIII short, segment IX longer, gut enlarged in IX.

Anteriorly 4, 5 bifid setae per bundle, upper tooth about as long and thick as lower (Fig. 1B); 1, 2 setae per bundle posteriorly, one ventral bundle of X with 1 seta (other side missing seta), no ventral setae in XI. No modified genital setae. From XIV–XV posteriorly ventral setae sharply simple-pointed; some (all?) posterior dorsal bundles with bifid and simple-pointed setae, bifid setae with upper tooth longer and much thicker than the very thin lower tooth (Fig. 1C). Male and spermathecal pores in setal line, spermathecal pores open anterior to ventral setae of X.

Male genitalia (all structures paired) (Fig. 1A): sperm funnel (sf) moderate in size, vas deferens (vd) $35.5\ \mu\text{m}$ wide behind sperm funnel narrowing to $16.9\ \mu\text{m}$ just before entry into atrium (at); vas deferens about as long as

atrium with wide ciliated lumen. Atrium with enlarged muscular (m) head, vas deferens and prostrate (pr) enter nearly opposite each other just below swollen head; prostate small, stalked. Atrium apparently tripartite with swollen head being composed of large (vacuolated?) cells, middle tubular portion composed of large granular cells, lower (distal) portion composed of small granular cells. Atrium narrows basally and then widens just before joining penial bulb. Atrium terminates in true penis (p) with thin cuticular sheath; penis sheath (ps) short (46 μm long) and wide (approx. 36 μm wide at base), slightly cone shaped, in short penial sac (psc).

Spermathecae (s) short (Fig. 1A) (approx. 200 μm in length) with thick walled ampullae and distinct ducts (approx. 35 μm wide), sperm traps (st) apparently present; basal end of duct bulbous (46 μm in diameter) with distinct lumen. No spermatozeugmata observed.

Material examined.—ZIZM cat. V9920. Lectotype of *T. heterochaetus*, whole mounted specimen.—USNM 62805, 62806, 2 whole mounted specimens from Cape Fear River (32 miles from coast), North Carolina. Sample from 25 ft, locality estuarine, medium sands with silt and organic detritus. B. Woodard coll., 28 Feb. 1980. Found with *Dero* sp., *Paranais* sp., *Nais communis*, *Nais variabilis* (all naidid oligochaetes), *Scolecopides viridis* (a spionid polychaete) (B. Woodard, pers. comm.).—Baker collection, 5 whole mounted specimens, locality and collector as for USNM specimens.—Woodard collection, 3 whole mounted specimens, locality and collector as for USNM specimens.

Distribution.—Europe, North Carolina, Virginia, U.S.A.

Discussion

The description of *Tubificoides heterochaetus* given here differs from the original (Michaelsen, 1926) in one important respect. In the original description the dorsal posterior setae were described as being sharply simple pointed. The lectotype of *T. heterochaetus* has some posterior dorsal setae which are clearly bifid (Fig. 1C). The lower tooth of these setae is very thin, rather short, and is not visible if the setae are not properly oriented.

Some of the recent literature (Brinkhurst and Jamieson, 1971; Brinkhurst and Baker, 1979) reported *T. heterochaetus* to be without a penis sheath. Although Michaelsen (1926:27, 28) did recognize that *T. heterochaetus* had a slightly thickened cuticular penis sheath he felt that it was not thick or stiff enough to be called a true penis sheath. *T. heterochaetus* is recognized here as possessing a true penis sheath.

The specimens of *T. heterochaetus* from North Carolina agree for the most part with the above description. These specimens reach a maximum length of 9 mm with up to 31 segments. There may be up to 3 setae per bundle posteriorly. Sperm traps (*sensu* Brinkhurst and Baker, 1979) are

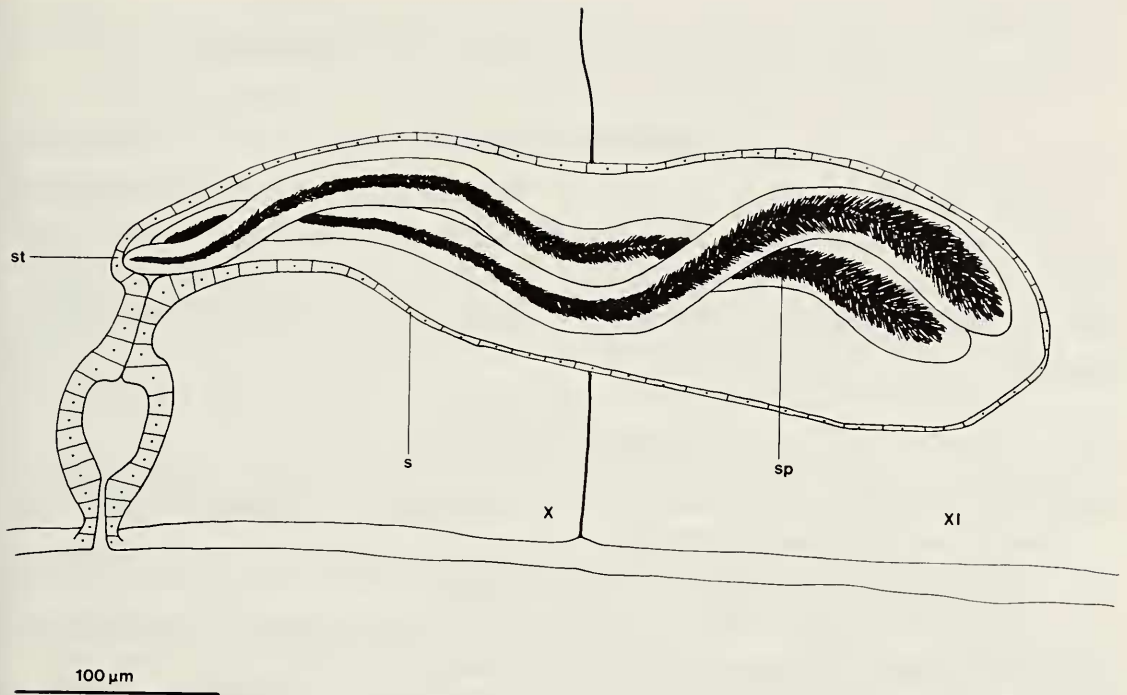


Fig. 2. *Tubificoides heterochaetus*: Spermathecae of a North Carolina specimen, notation as in description, sperm trap clearly present, basal portion of spermathecal duct bulbous with distinct lumen.

present in the North Carolina specimens (Fig. 2). As the lectotype had not yet mated (shown by lack of spermatozeugmata in the spermathecae) this feature was not as apparent. The spermatozeugmata (sp) in the North Carolina *heterochaetus* are elongate in shape (Fig. 2). One or both of the spermathecal ampullae often penetrate the sperm sac into XI. In most of the North Carolina *heterochaetus* there is 1 seta present per ventral bundle of X.

In the North Carolina specimens the atrial muscle layer below the head of the atria does not thin out as fast and remains slightly thicker than does the muscle layer in the lectotype (Fig. 1A). This may be due to different fixing procedures in the material from the two locations.

The North Carolina *heterochaetus* also have bifid dorsal setae posteriorly which are of the same form as those of the lectotype. This is a very unusual characteristic in the Tubificinae as the upper tooth is usually the tooth which undergoes reduction. The presence of this feature in both the lectotype and the North Carolina *heterochaetus* is a very strong indication that the North Carolina material is indeed *T. heterochaetus*. Many of these dorsal posterior bundles consist of 1 bifid seta with the other setae being sharply simple-pointed setae.

The North Carolina *heterochaetus* are similar to the lectotype in their degree of papillation.

All members of the genus *Tubificoides* (*sensu* Brinkhurst and Baker, 1979) are now known to possess a penis sheath of some form.

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